Wireless Fusion Enterprise Mobility Suite

User Guide for Version 2.55

Wireless Fusion Enterprise Mobility Suite User Guide for Version 2.55

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Motorola, Inc.
One Motorola Plaza
Holtsville, New York 11742-1300
http://www.symbol.com

Patents

This product is covered by one or more of the patents listed on the website: www.symbol.com/patents

Revision History

Changes to the original manual are listed below:

Change	Date	Description
-01 Rev A	11/2007	Initial release.

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About This Guide

Introduction

This guide provides information about using the Wireless Applications software on a Motorola Enterprise mobility mobile computer.

NOTE Screens and windows pictured in this guide are samples and can differ from actual screens.

Chapter Descriptions

Topics covered in this guide are as follows:

- Chapter 1, Getting Started provides information enabling the wireless radio.
- Chapter 2, Find WLAN Application provides information about the Find WLAN application.
- Chapter 3, Manage Profiles Application provides information about managing profiles.
- Chapter 4, Profile Editor Wizard explains how to configure a profile.
- Chapter 5, Manage Certificates Application explains how to manage certificates.
- Chapter 6, Manage PACs Application explains how to manage PACs.
- Chapter 7, Options explains how to configure the application options.
- Chapter 8, Wireless Status Application describes the status indication.
- Chapter 9, Wireless Diagnostics Application explains how to diagnose the wireless connection.
- Chapter 10, Log on/Off Application explains how to log on and off the wireless network.
- Chapter 11, Persistence and Registry Settings explains how to configure persistence and describes registry settings.

Notational Conventions

The following conventions are used in this document:

- *Italics* are used to highlight the following:
  - Chapters and sections in this and related documents
  - Dialog box, window and screen names
  - Icons on a screen.
- **Bold** text is used to highlight the following:
  - Key names on a keypad
  - Button names on a screen or window.
  - Drop-down list and list box names
  - Check box and radio button names
- bullets (•) indicate:
  - Action items
  - Lists of alternatives
  - Lists of required steps that are not necessarily sequential
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.

NOTE This symbol indicates something of special interest or importance to the reader. Failure to read the note will not result in physical harm to the reader, equipment or data.

CAUTION This symbol indicates that if this information is ignored, the possibility of data or material damage may occur.

WARNING! **This symbol indicates that if this information is ignored the possibility that serious personal injury may occur.**

Related Documents

- *Enterprise Mobility Developer Kit for C (EMDK for C),* available at: http://devzone.symbol.com/.
- ActiveSync 4.x software, available at: http://www.microsoft.com.

For the latest version of this guide and all guides, go to: http://www.symbol.com/manuals.

Service Information

If you have a problem with your equipment, contact Motorola Enterprise Mobility support for your region. Contact information is available at: http://www.symbol.com/contactsupport.

When contacting Enterprise Mobility support, please have the following information available:

- Serial number of the unit
- Model number or product name
- Software type and version number

Motorola responds to calls by email, telephone or fax within the time limits set forth in support agreements.

If your problem cannot be solved by Motorola Enterprise Mobility Support, you may need to return your equipment for servicing and will be given specific directions. Motorola is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty.

If you purchased your Enterprise Mobility business product from a Motorola business partner, contact that business partner for support.

Chapter 1 Getting Started

Introduction

The Wireless Fusion Enterprise Mobility Suite is a set of applications that provide the tools to configure and test the wireless radio in an Motorola Enterprise Mobility mobile device.

Wireless Local Area Networks (WLANs) allow mobile devices to communicate wirelessly and send captured data to a host device in real time. Motorola mobile devices can support the IEEE 802.11a, 802.11b and 802.11g standards. Refer to the mobile device's user documentation for the supported IEEE 802.11 standards. Before using the mobile computer on a WLAN, the facility must be set up with the required hardware to run the wireless LAN and the mobile computer must be configured. Refer to the documentation provided with the access points (APs) for instructions on setting up the hardware.

The **Wireless Application** menu on the task tray provides the following wireless applications:

- Find WLANs
- Manage Profiles
- Manage Certs
- Manage PACs
- Options
- Wireless Status
- Wireless Diagnostics
- Log On/Off
- Enable/Disable Radio.

Tap the **Signal Strength** icon to display the **Wireless Applications** menu.

NOTE Some devices do not have touch screens. Procedures in this guide assume that the device has a touch screen. For those devices without touch screens, refer to the device's user documentation for information on navigating using the keypad.

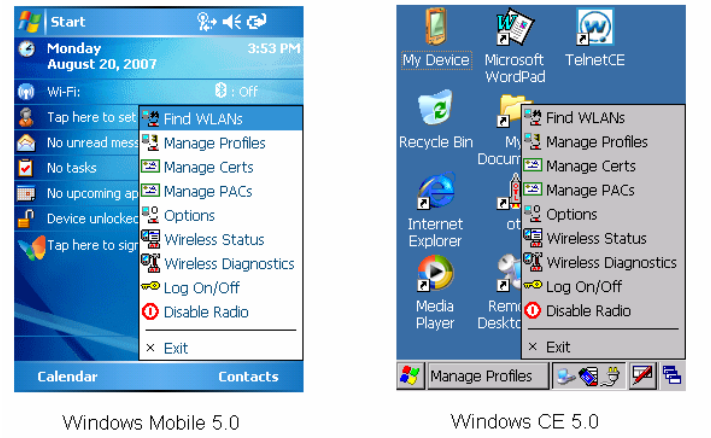

Figure 1-1 *Wireless Applications Menu*

The **Signal Strength** icon in the task tray indicates the mobile computer's wireless signal strength as follows:

Table 1-1 *Wireless Applications Icons, Signal Strength Descriptions*

Icon	Status	Action
	Excellent signal strength	Wireless LAN network is ready to use.
	Very good signal strength	Wireless LAN network is ready to use.
	Good signal strength	Wireless LAN network is ready to use.
	Fair signal strength	Wireless LAN network is ready to use. Notify the network administrator that the signal strength is only "Fair".
	Poor signal strength	Wireless LAN network is ready to use. Performance may not be optimum. Notify the network administrator that the signal strength is "Poor".
	Out-of-network range (not associated)	No wireless LAN network connection. Notify the network administrator.
	No wireless LAN network card detected	No wireless LAN network card detected or radio disabled. Notify the network administrator.

Turning the WLAN Radio On and Off

To turn the WLAN radio off tap the **Signal Strength** icon and select **Disable Radio**.

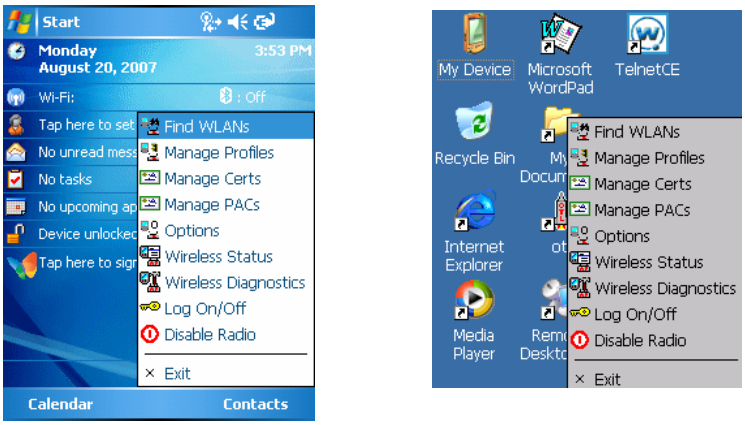

Figure 1-2 *Disable Radio*

To turn the WLAN radio on tap the **Signal Strength** icon and select **Enable Radio**.

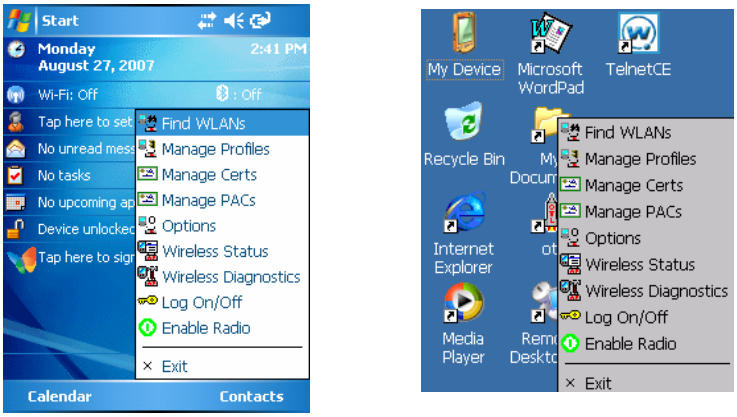

Figure 1-3 *Enable Radio*

Chapter 2 Find WLAN Application

Introduction

Use the **Find WLANs** application to discover available networks in the vicinity of the mobile device. To open the **Find WLANs** application, tap the **Signal Strength** icon > **Find WLANs**. The **Find WLANs** window displays.

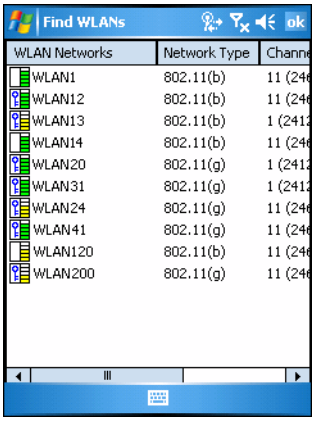

Figure 2-1 *Find WLANs Window*

NOTE The **Find WLANs** display is limited to 32 items (ESSIDs or MAC addresses). A combination of up to 32 ESSIDs/APs may be displayed.

Manually enter valid ESSIDs not displayed in the **Find WLANs** window. See *Figure 2-1 on page 2-1*.

The *Find WLANs* list displays:

- WLAN Networks - Available wireless networks with icons that indicate signal strength and encryption type. The signal strength and encryption icons are described in *Table 2-1* and *Table 2-2*.
- Network Type - Type of network.
- Channel - Channel on which the AP is transmitting.
- Signal Strength - The signal strength of the signal from the AP.

Table 2-1 *Signal Strength Icon*

Icon	Description
	Excellent signal
	Very good signal
	Good signal
	Fair signal
	Poor signal
	Out of range or no signal

Table 2-2 *Encryption Icon*

Icon	Description
	No encryption. WLAN is an infrastructure network.
	WLAN is an Ad-Hoc network.
	WLAN access is encrypted and requires a password.

Tap-and-hold on a WLAN network to open a pop-up menu which provides two options: **Connect** and **Refresh**. Select **Refresh** to refresh the WLAN list. Select **Connect** to create a wireless profile from that network. This starts the **Profile Editor Wizard** which allows the user to set the values for the selected network. After editing the profile, the mobile computer automatically connects to this new profile.

Chapter 3 Manage Profiles Application

Introduction

The **Manage Profiles** application provides a list of user-configured wireless profiles. Define up to 32 profiles at any one time. To open the **Manage Profiles** application, tap the **Signal Strength** icon > **Manage Profiles**.

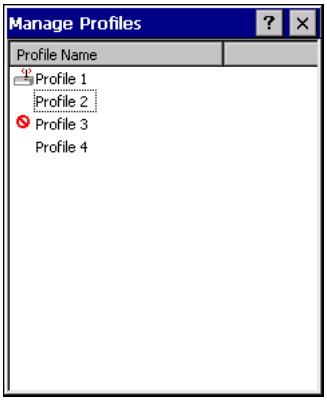

Figure 3-1 *Manage Profiles Window*

Icons next to each profile identify the profile's current state.

Table 3-1 *Profile Icons*

Icon	Description
No Icon	Profile is not selected, but enabled.
	Profile is disabled.
	Profile is cancelled. A cancelled profile is disabled until a connect or login function is performed through the configuration editor.
	Profile is in use and describes an infrastructure profile not using encryption.

Table 3-1 *Profile Icons (Continued)*

Icon	Description
	Profile is in use and describes an infrastructure profile using encryption.
	Profile is in use and describes an ad-hoc profile not using encryption.
	Profile is in use and describes an ad-hoc profile using encryption.
	Profile is not valid in the device current operating regulatory domain.

The profiles are listed in priority order for use by the automatic roaming feature. Change the order by moving profiles up or down. To edit existing profiles, tap and hold one in the list and select an option from the menu to connect, edit, disable (enable), or delete the profile. (Note that the *Disable* menu item changes to *Enable* if the profile is already disabled.)

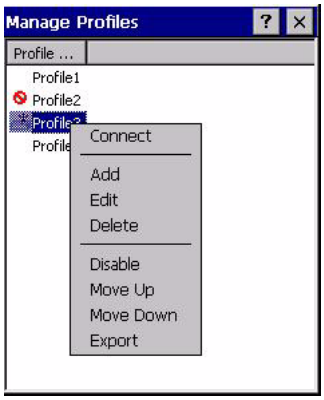

Figure 3-2 *Manage Profiles Context Menu*

Changing Profiles

A completed profile is a set of configuration settings that can be used in different locations to connect to a wireless network. Create different profiles to have pre-defined operating parameters available for use in various network environments. When the **WLAN Profiles** window displays, existing profiles appear in the list.

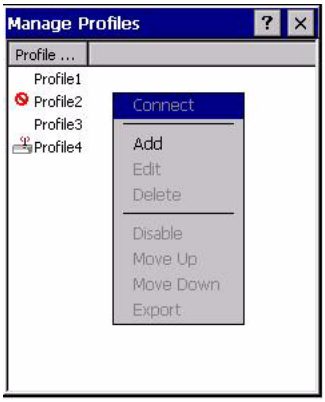

Figure 3-3 *Manage Profiles*

Tap and hold a profile and select **Connect** from the pop-up menu to set this as the active profile. Once selected, the mobile computer uses the setting configured for the profile (i.e., authentication, encryption, ESSID, IP Config, power consumption, etc.).

Editing a Profile

Tap and hold a profile and select **Edit** from the pop-up menu to display the **Profile Wizard** where the profile settings are configured. See Chapter 4, Profile Editor Wizard for instruction on editing a profile.

Creating a New Profile

To create new profiles from the **Manage Profiles** window, tap-and-hold anywhere in this window.

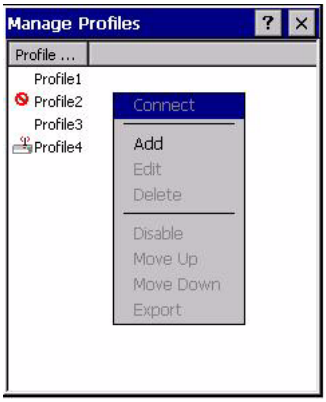

Figure 3-4 *Manage Profiles - Add*

Select **Add** to display the **Profile Wizard** wherein the settings for the new profile are configured, such as profile name, ESSID, security, network address information, and the power consumption level.

Deleting a Profile

To delete a profile from the list, tap and hold the profile and select **Delete** from the pop-up menu. A confirmation dialog box appears.

Ordering Profiles

Tap and hold a profile from the list and select **Move Up or Move Down** to order the profile. If the current profile association is lost, the mobile computer attempts to associate with the first profile in the list, then the next, until it achieves a new association.

NOTE Profile Roaming must be enabled in the Options application. See *System Options on page 7-3*.

Export a Profile

To export a profile to a registry file, tap and hold a profile from the list and select **Export** from the pop-up menu. The **Save As** dialog box displays with the **Application** folder and a default name of WCS_PROFILE{*profile GUID*}.reg (Globally Unique Identifier).

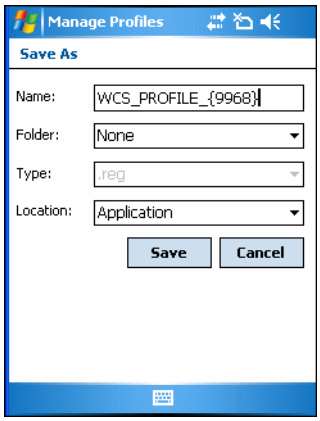

Figure 3-5 *Save As Dialog Box*

If required, change the name in the **Name** field and tap **Save**. A confirmation dialog box appears after the export completes.

Chapter 4 Profile Editor Wizard

Introduction

Use the **Profile Editor Wizard** to create a new profile or edit an existing profile. If editing a profile, the fields reflect the current settings for that profile. If creating a new profile, the known information for that WLAN network appears in the fields.

Navigate through the wizard using the **Next** and **Back** buttons. Tap **X** to quit. On the confirmation dialog box, tap **No** to return to the wizard or tap **Yes** to quit and return to the **Manage Profiles** window. See Chapter 3, Manage Profiles Application for instructions on navigating the **Profile Editor Wizard**.

Profile ID

In the **Profile ID** dialog box in the **Profile Editor Wizard**, enter the profile name and the ESSID.

Figure 4-1 *Profile ID Dialog Box*

Table 4-1 *Profile ID Fields*

Field	Description
Name	The name and (WLAN) identifier of the network connection. Enter a user friendly name for the mobile computer profile used to connect to either an AP or another networked computer. Example: The Public LAN.
ESSID	The ESSID is the 802.11 extended service set identifier. The ESSID is 32-character (maximum) string identifying the WLAN, and must match the AP ESSID for the mobile computer to communicate with the AP.

NOTE Two profiles with the same user friendly name are acceptable but not recommended.

Tap **Next.** The *Operating Mode* dialog box displays.

Operating Mode

Use the **Operating Mode** dialog box to select the operating mode (Infrastructure or Ad-Hoc) and the country location.

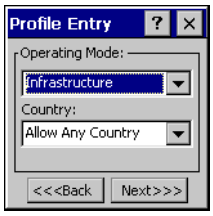

Figure 4-2 *Operating Mode Dialog Box*

Table 4-2 *Operating Mode Fields*

Field	Description
Operating Mode	Select **Infrastructure** to enable the mobile computer to transmit and receive data with an AP. Infrastructure is the default mode. Select **Ad Hoc** to enable the mobile computer to form its own local network where mobile computers communicate peer-to-peer without APs using a shared ESSID.
Country	**Country** determines if the profile is valid for the country of operation. The profile country must match the country in the options page or it must match the acquired country if 802.11d is enabled. **Single Country Use:** When the device is only used in a single country, set every profile country to **Allow Any Country**. In the **Options** > **Regulatory** dialog box (see *Figure 7-2 on page 7-2*), select the specific country the device is used in, and deselect the **Enable 802.11d** option. This is the most common and efficient configuration, eliminating the initialization overhead associated with acquiring a country via 802.11d. **Multiple Country Use:** When the device is used in more than one country, select the **Enable 802.11d** option in the **Options** > **Regulatory** dialog box (see *Figure 7-2 on page 7-2*). This eliminates the need for reprogramming the country (in **Options** > **Regulatory**) each time the user enters a new country. However, this only works if the infrastructure (i.e., APs) supports 802.11d (some infrastructures do not support 802.11d, including some Cisco APs). When the Enable 802.11d option is selected, the **Options** > **Regulatory** > **Country** setting is not used. For a single profile that can be used in multiple countries, with infrastructure that supports 802.11d (including Symbol infrastructure), set the Profile Country to **Allow Any Country**. Under **Options** > **Regulatory**, select **Enable 802.11d**. The **Options** > **Regulatory** > **Country** setting is not used.

Table 4-2 *Operating Mode Fields (Continued)*

Field	Description
Country (Cont'd)	For a single profile that can be used in multiple countries, but with infrastructure that does not support 802.11d, set the profile country to **Allow Any Country,** and de-select (uncheck) **Enable 802.11d**. In this case, the **Options** > **Regulatory** > **Country** setting must always be set to the country the device is currently in. This configuration option is the most efficient and may be chosen for use with any infrastructure. However, the **Options** > **Regulatory** > **Country** setting must be manually changed when a new country is entered. Note that using a single profile in multiple countries implies that there is a common ESSID to connect to in each country. This is less likely than having unique ESSIDs in each country, this requires unique profiles for each country.
	For additional efficiency when using multiple profiles that can be used in multiple countries, the country setting for each profile can be set to a specific country. If the current country (found via 802.11d or set by **Options** > **Regulatory** > **Country** when 802.11d is disabled) does not match the country set in a given profile, then that profile is disabled. This can make profile roaming occur faster. For example, if two profiles are created and configured for Japan, and two more profiles are created and configured for USA, then when in Japan only the first two profiles are active, and when in USA only the last two are active. If they had all been configured for **Allow Any Country**, then all four would always be active, making profile roaming less efficient.

Tap **Next**. If **Ad-Hoc** mode was selected the **Ad-Hoc** dialog box displays. If **Infrastructure** mode was selected the **Authentication** dialog box displays. See *Authentication on page 4-3* for instruction on setting up authentication.

Ad-Hoc

Use the **Ad-Hoc** dialog box to select the required information to control **Ad-Hoc** mode. This dialog box does not appear if **Infrastructure** mode is selected. To select Ad-Hoc mode:

1. Select a channel number from the **Channel** drop-down list. The default is **Channel 1 (2412 MHz)**.

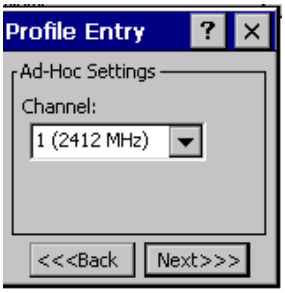

Figure 4-3 *Ad-Hoc Settings Dialog Box*

2. Tap **Next**. The **Encryption** dialog box displays. See *Encryption on page 4-13* for encryption options.

Authentication

Use the **Authentication** dialog box to configure authentication. If **Ad-Hoc** mode is selected, this dialog box is not available and authentication is set to **None** by default.

Select an authentication type from the drop-down list and tap **Next**. Selecting **PEAP, TTLS** or **EAP-FAST** displays the **Tunneled** dialog box. Selecting **None**, **TLS**, or **LEAP** displays the **Encryption** dialog box. See *Credential Cache Options on page 4-11* for encryption options. *Table 4-3* lists the available authentication options.

Figure 4-4 *Authentication Dialog Box*

Table 4-3 *Authentication Options*

Authentication	Description
None	Default setting when authentication is not required on the network.
EAP-TLS	Select this option to enable EAP-TLS authentication. EAP-TLS is an authentication scheme through IEEE 802.1x. It authenticates users and ensures only valid users can connect to the network. It also restricts unauthorized users from accessing transmitted information by using secure authentication certificates.
PEAP	Select this option to enable PEAP authentication. This method uses a digital certificate to verify and authenticate a user's identity.
LEAP	Select this option to enable LEAP authentication, which is based on mutual authentication. The AP and the connecting mobile computer require authentication before gaining access to the network.
TTLS	Select this option to enable TTLS authentication.
EAP-FAST	Select this option to enable EAP-FAST authentication.

Tunneled Authentication

Use the **Tunneled Authentication** dialog box to select the tunneled authentication options. There are different selections available for PEAP, TTLS or EAP-FAST authentication.

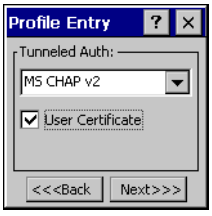

Figure 4-5 *Tunneled Authentication Dialog Box*

To select a tunneled authentication type:

1. Select a tunneled authentication type from the drop-down list. See *Table 4-4*, *Table 4-5* and *Table 4-6*.
2. Select the **User Certificate** check box if a certificate is required. If the TLS tunnel type that requires a user certificate is selected, the check box is already selected.
3. Tap **Next**. The **Installed User Certificates** dialog box appears.

Table 4-4 lists the PEAP tunneled authentication options.

Table 4-4 *PEAP Tunneled Authentication Options*

PEAP Tunneled Authentication	Description
MS CHAP v2	Microsoft Challenge Handshake Authentication Protocol version 2 (MS CHAP v2) is a password-based, challenge-response, mutual authentication protocol that uses the industry-standard Message Digest 4 (MD4) and Data Encryption Standard (DES) algorithms to encrypt responses. The authenticating server challenges the access client and the access client challenges the authenticating server. If either challenge is not correctly answered, the connection is rejected. MS CHAP v2 was originally designed by Microsoft as a PPP authentication protocol to provide better protection for dial-up and virtual private network (VPN) connections. With Windows XP SP1, Windows XP SP2, Windows Server 2003, and Windows 2000 SP4, MS CHAP v2 is also an EAP type.
TLS	EAP TLS is used during phase 2 of the authentication process. This method uses a user certificate to authenticate.
EAP-GTC	EAP-GTC is used during phase 2 of the authentication process. This method uses a time-synchronized hardware or software token generator, often in conjunction with a user PIN, to create a one-time password.

Table 4-5 lists the TTLS tunneled authentication options.

Table 4-5 *TTLS Tunneled Authentication Options*

TTLS Tunneled Authentication	Description
CHAP	Challenge Handshake Authentication Protocol (CHAP) is one of the two main authentication protocols used to verify the user name and password for PPP Internet connections. CHAP is more secure than PAP because it performs a three way handshake during the initial link establishment between the home and remote machines. It can also repeat the authentication anytime after the link is established.
MS CHAP	Microsoft Challenge Handshake Authentication Protocol (MS CHAP) is an implementation of the CHAP protocol that Microsoft created to authenticate remote Windows workstations. MS CHAP is identical to CHAP, except that MS CHAP is based on the encryption and hashing algorithms used by Windows networks, and the MS CHAP response to a challenge is in a format optimized for compatibility with Windows operating systems.
MS CHAP v2	MS CHAP v2 is a password based, challenge response, mutual authentication protocol that uses the industry standard Message Digest 4 (MD4) and Data Encryption Standard (DES) algorithms to encrypt responses. The authenticating server challenges the access client and the access client challenges the authenticating server. If either challenge is not correctly answered, the connection is rejected. MS CHAP v2 was originally designed by Microsoft as a PPP authentication protocol to provide better protection for dial-up and virtual private network (VPN) connections. With Windows XP SP1, Windows XP SP2, Windows Server 2003, and Windows 2000 SP4, MS CHAP v2 is also an EAP type.

Table 4-5 *TTLS Tunneled Authentication Options (Continued)*

TTLS Tunneled Authentication	Description
PAP	Password Authentication Protocol (PAP) has two variations: PAP and CHAP PAP. It verifies a user name and password for PPP Internet connections, but it is not as secure as CHAP, since it works only to establish the initial link. PAP is also more vulnerable to attack because it sends authentication packets throughout the network. Nevertheless, PAP is more commonly used than CHAP to log in to a remote host like an Internet service provider.
MD5	Message Digest-5 (MD5) is an authentication algorithm developed by RSA. MD5 generates a 128-bit message digest using a 128-bit key, IPSec truncates the message digest to 96 bits.

Table 4-6 lists the EAP-FAST tunneled authentication options.

Table 4-6 EAP-FAST Tunneled Authentication Options

EAP-FAST Tunneled Authentication	Description
MS CHAP v2	Microsoft Challenge Handshake Authentication Protocol version 2 (MS CHAP v2) is a password-based, challenge-response, mutual authentication protocol that uses the industry-standard Message Digest 4 (MD4) and Data Encryption Standard (DES) algorithms to encrypt responses. The authenticating server challenges the access client and the access client challenges the authenticating server. If either challenge is not correctly answered, the connection is rejected. MS CHAP v2 was originally designed by Microsoft as a PPP authentication protocol to provide better protection for dial-up and virtual private network (VPN) connections. With Windows XP SP1, Windows XP SP2, Windows Server 2003, and Windows 2000 SP4, MS CHAP v2 is also an EAP type.
TLS	EAP TLS is used during phase 2 of the authentication process. This method uses a user certificate to authenticate.
EAP-GTC	EAP-GTC is used during phase 2 of the authentication process. This method uses a time-synchronized hardware or software token generator, often in conjunction with a user PIN, to create a temporary password that expires after a short period of time.

User Certificate Selection

If the user checked the **User Certificate** check box on the **Tunneled Authentication** dialog box or if **TLS** is the selected authentication type, the **Installed User Certificates** dialog box displays. Select a certificate from the drop-down list of currently installed certificates before proceeding. The selected certificate's name appears in the drop-down list. If the required certificate is not in the list, install it.

Figure 4-6 *Installed User Certificates Dialog Box*

User Certificate Installation

To install a user certificate for authentication:

1. Tap **Install Certificate**. The **Import Certificate** dialog box appears.

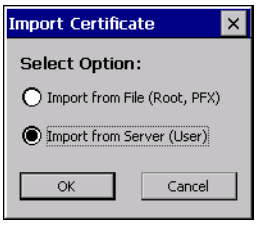

Figure 4-7 *Import Certificate Dialog Box*

2. Choose **Import from Server (User)** and tap **OK**.

The **Install from Server** dialog box appears.

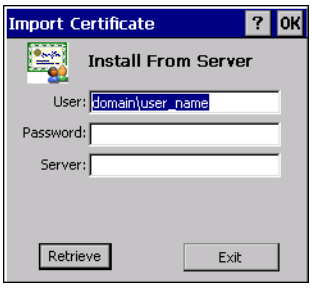

Figure 4-8 *Install from Server Dialog Box*

1. Enter the User:, Password: and Server: information in their respective text boxes.
2. Tap **Retrieve**. A Progress dialog indicates the status of the certificate retrieval.
3. Tap **Exit** to exit.

After the installation completes, the **Installed User Certs** dialog box displays and the certificate is available in the drop-down for selection.

NOTE To successfully install a user certificate, the mobile computer must already be connected to a network from which the server is accessible.

Server Certificate Selection

If the user selects the **Validate Server Certificate** check box, a server certificate is required. Select a certificate from the drop-down list of currently installed certificates in the **Installed Server Certificates** dialog box. An hour glass may appear as the wizard populates the existing certificate list. If the required certificate is not listed, install it.

Figure 4-9 *Installed Server Certificates Dialog Box*

Server Certificate Installation

To install a server certificate for authentication:

1. Tap **Install Certificate**. The **Import Certificate** dialog box appears. Choose **Import from File (Root, PFX)** and tap **OK**.

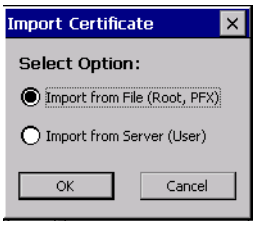

Figure 4-10 *Import Certificates Dialog Box*

2. A dialog box appears that lists the certificate files found in the default directory (Application directory for Windows CE and all folders for Windows Mobile) with the default extension.

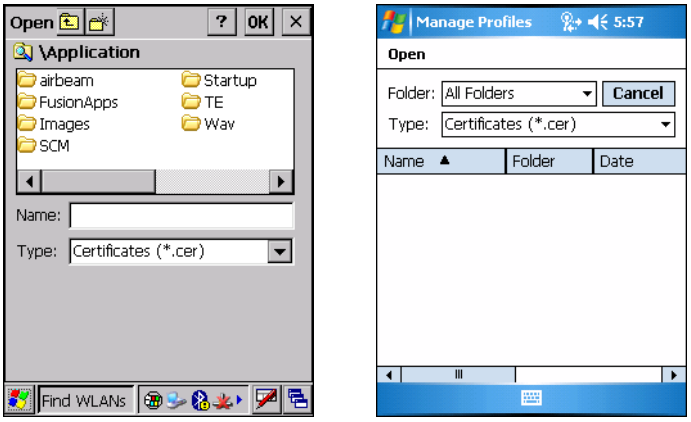

Figure 4-11 *Browse Server Certificates*

3. Locate a certificate:

a. For Windows Mobile, select a different folder, if applicable, using the Folder drop-down list. Tap the certificate filename. The certificate installs automatically.

b. For Windows CE, navigate to the folder where the certificate is stored. Tap the certificate filename and then tap ok.

4. A confirmation dialog verifies the installation. If the information in this dialog is correct, tap the Yes button, If the information in this dialog is not correct tap the No button. The wizard returns to the **Installed Server Certs** dialog box. Select the newly-installed certificate from the drop down list.

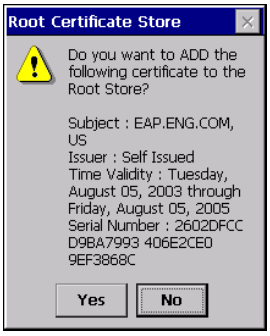
Root Certificate Store
Do you want to ADD the following certificate to the Root Store?
Subject : EAP.ENG.COM, US
Issuer : Self Issued
Time Validity : Tuesday, August 05, 2003 through Friday, August 05, 2005
Serial Number : 2602DFCC D9BA7993 406E2CE0 9EF3868C
Yes
No

Figure 4-12 *Confirmation Dialog Box*

User Name

The user name and password can be entered (but is not required) when the profile is created. When a profile authenticates with credentials that were entered in the profile, credential caching rules do not apply. Caching rules only apply on credentials that are entered through the login dialog box.

If the profile uses an authentication tunnel type of EAP-GTC and Token is selected (see Password on *Password on page 4-9*), then you can control certain behavior by whether you choose to enter a value in the **User Name** field. If you enter a value in the **User Name** field, then whenever the Fusion software prompts you to enter credentials, the username field in the interactive credential dialog will be initialized with the value that you entered when you created the profile. If you enter a different value in the username field of the interactive credential dialog, it is cached and used to initialize the username field the next time the interactive credential dialog is shown. If you do not enter a value in the **User Name** field when you create an EAP-GTC token profile, then the username field in the interactive credential dialog is initialized to blank. After you enter a username in the interactive credential dialog, it is cached as usual, but it is not be used to initialize the username field the next time the interactive credential dialog is shown; the username field will still be initialized to blank. In summary, the user can control whether the username field in the interactive credential dialog box is initialized, either with the last-entered username or with the username entered into the profile, by whether any value is entered in the **User Name** field during profile entry.

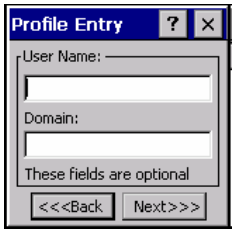

Figure 4-13 *Username Dialog Box*

Password

Use the **Password** dialog box to enter a password. If EAP/TLS is the selected authentication type, the password dialog box does not display.

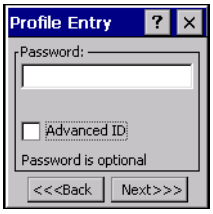

Figure 4-14 *Password Dialog Box*

1. Enter a password in the **Password** field.

   If an authentication tunnel type of EAP-GTC is used, a **Password** dialog box with additional radio buttons displays.

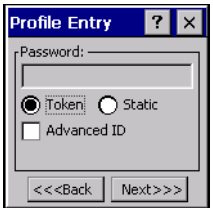

Figure 4-15 *EAP-GTC Password Dialog Box*

Two radio buttons are added to allow the user to choose a token or static password.

Choose the **Token** radio button when using the profile in conjunction with a token generator (hardware or software). The system administrator should supply the user with a token generator for use with EAP-GTC token profiles. A token generator generates a numeric value that is entered into the password field at connect time, usually along with a PIN. Tokens have a very limited lifetime and usually expire within 60 seconds. The token generator is time-synchronized with a token server. When authenticating, the RADIUS server asks the token server to verify the token entered. The token server knows what value the token generator generates given the time of day and the username. Since tokens expire, EAP-GTC token profiles are treated differently. A prompt appears at the appropriate time to enter a token, even if a token has previously been entered. Tokens are never cached in the credential cache (though the username that is entered when the token is entered is cached).

Choose the **Static** radio button, the **Password** field is enabled and a password can be entered if desired. A profile that uses an EAP-GTC tunnel type with a static password is handled in the same manner as other profiles that have credentials that don't expire.

1. Select the **Advanced ID** check box, if advanced identification is required.
2. Tap **Next.** The **Prompt for Login at** dialog box displays. See *Credential Cache Options on page 4-11*.

Advanced Identity

Use the **Advanced ID** dialog box to enter the 802.1X identity to supply to the authenticator. This value can be 63 characters long and is case sensitive. In TTLS and PEAP, it is recommended entering the identity *anonymous* (rather than a true identity) plus any desired realm (e.g., anonymous@myrealm). A user ID is required before proceeding.

NOTE When authenticating with a Microsoft IAS server, do not use advanced identity.

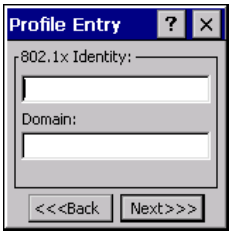

Figure 4-16 *Advanced Identity Dialog Box*

Tap **Next**. The **Encryption** dialog box displays.

Credential Cache Options

If the user selected any of the password-based authentication types then different credential caching options are available. These options specify when the network credential prompts appear: at connection, on each resume, or at a specified time.

Entering the credentials directly into the profile permanently caches the credentials. In this case, the mobile computer does not require user login. If a profile does not contain credentials entered through the configuration editor, credentials must be entered when prompted, either when connecting to the profile in the **Manage Profiles** window, or when logging into the mobile computer.

Caching options only apply on credentials entered through the login dialog box.

Figure 4-17 *Prompt for Login at Dialog Box*

If the mobile computer does not have the credentials, a username and password must be entered. If the mobile computer has the credentials (previous entered via a login dialog box), it uses these credentials unless the caching options require the mobile computer to prompt for new credentials. If credentials were entered via the profile, the mobile computer does not prompt for new credentials (except for profiles where the credentials expire, such as EAP-GTC token profiles). *Table 4-7* lists the caching options.

Table 4-7 Cache Options

Option	Description
At Connect	Select this option to have mobile computer prompt for credentials whenever it tries to connect to the profile. Deselect this to use the cached credentials to authenticate. If the credentials are not cached, the user is prompted to enter credentials. This option only applies when the user has previously logged in to the profile.

Table 4-7 Cache Options *(Continued)*

Option	Description
On Resume	Selecting this reauthenticates an authenticated user when a suspend/resume occurs. Once reauthenticated, the user is prompted for credentials. If the user does not enter the same credentials that were entered prior to the suspend/resume within three attempts, the user is disconnected from the network. This option only applies when the user has previously logged in to the profile.
At Time	Select this option to perform a local verification on an authenticated user at a specified time. The time can be an absolute time or a relative time from the authentication, and should be in at least five minute intervals. Once the time has passed, the user is prompted for credentials. If the user does not enter the same credentials that were entered prior to the At-Time event within three attempts, the user is disconnected from the network. This option only applies when the user has previously logged in to the profile.

NOTE Entering credentials applies the credentials to a particular profile. Logging out clears all cached credentials. Editing a profile clears any cached credentials for that profile.

The following authentication types have credential caching:

- EAP TLS
- PEAP
- LEAP
- TTLS
- EAP-FAST.

Some exceptions to the credential caching rules apply for profiles where the credentials expire, such as EAP-GTC token profiles. Since the token expires after a short period, the user is prompted for credentials even when credentials have already been entered and cached for that profile. The At Connect caching option has a slightly different function. If the user leaves the box unchecked, then the Fusion software will try to authenticate without prompting the user for a new token. If Fast Session Reconnect is enabled on the RADIUS server and the mobile computer has been previously connected and authenticated using the same profile, then the mobile computer may be able to reconnect without going through the entire authentication process. In this case, new credentials are not required (even though the old ones have expired) and the Fusion software will not prompt the user for new credentials. If Fast Session Reconnect is not enabled on the RADIUS server or if the user has checked the At Connect checkbox, then the user will be prompted to enter new credentials. Note also that the On Resume caching option will always be forced to “checked” for profiles where the credentials expire. This is necessary because the Fusion software does not support the use of Fast Session Reconnect across a suspend / resume cycle; therefore, new credentials will always be needed.

Selecting the **At Time** check box displays the **Time Cache Options** dialog box.

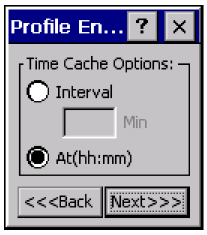

Figure 4-18 *Time Cache Options Dialog Box*

1. Tap the **Interval** radio button to check credentials at a set time interval.
2. Enter the value in minutes in the **Min** text box.
3. Tap the **At (hh:mm)** radio button to check credentials at a set time.
4. Tap **Next**. The **At Time** dialog box appears.

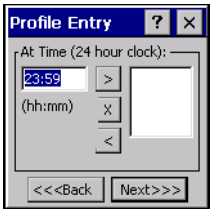

Figure 4-19 *At Time Dialog Box*

5. Enter the time using the 24 hour clock format in the **(hh:mm)** text box.
6. Tap **>** to move the time to the right. Repeat for additional time periods.
7. Tap **Next**. The **Encryption** dialog box displays.

Encryption

Use the **Encryption** dialog box to select an encryption type. The drop-down list includes encryption types available for the selected authentication type. Note that when the user selects **None** as the authentication type, the user must manually enter pre-shared encryption keys (or a passkey phrase). When the user selects other authentication modes, 802.1x authentication is used and the keys are automatically generated. See *Table 4-9* for a matrix of authentication modes and the available encryption types.

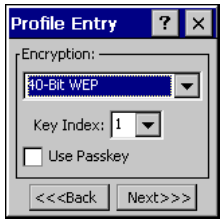

Figure 4-20 *Encryption Dialog Box*

Table 4-8 *Encryption Options*

Encryption	Description
Open	Select *Open* (the default) when no data packet encryption is needed over the network. Selecting this option provides no security for data transmitted over the network.
40-Bit WEP	Select 40-Bit WEP to use 40-bit key length WEP encryption. WEP keys can be automatically generated using a passkey (check the Use Passkey check box) or they can be manually entered in the edit boxes. Only the required number of edit boxes for a key length is displayed (10 Hex digit value for 40-bit keys). Use the **Key Index** drop-down list to configure the four WEP keys. The adapter uses the selected key. Note: As a security precaution when entering the key values for the network, the digits are replaced with asterisks * in the encryption key fields. If the associated AP uses an optional passkey, the active adapter WLAN profile must use one as well. The passkey is used to generate the WEP keys. The passkey provides an easy way to enter WEP key data without having to remember the entire 40-bit (10 character) Hex digit string.
128-Bit WEP	Select 128-Bit WEP to use 128-bit key length WEP encryption. WEP keys are manually entered in the edit boxes. Only the required number of edit boxes for a key length is displayed (26 Hex digit value for 128-bit keys). Use the *Key Index* drop-down list to configure the four WEP keys. The adapter uses the selected key. Note: As a security precaution when entering the key values for the network, the digits are replaced with asterisks * in the encryption key fields. If the associated AP uses an optional passkey, the active adapter WLAN profile must use one as well. The passkey is used to generate the WEP keys. The passkey provides an easy way to enter WEP key data without having to remember the entire 128-bit (26 character) Hex digit string.
TKIP	Select this option to use Wireless Protected Access (WPA) via TKIP. Tap **Next** to display the passkey dialog box then enter an 8 to 63 character passkey string in the passkey field.
AES (Fusion 2.5 and later only)	Select this option to use Wireless Protected Access 2 (WPA2) Advanced Encryption Standard (AES). Tap **Next** to display the passkey dialog box and then enter an 8 to 63 character passkey string in the passkey field.

Table 4-9 *Encryption / Authentication Matrix*

	Encryption			
Authentication	**Open**	**WEP**	**TKIP**	**AES (Fusion 2.5 and later only)**
None	Yes	Yes	Yes	Yes
EAP TLS	No	Yes	Yes	Yes
PEAP	No	Yes	Yes	Yes
LEAP	No	Yes	Yes	Yes
TTLS	No	Yes	Yes	Yes
EAP-FAST	No	Yes	Yes	Yes

Key Entry Page

If either **40-Bit WEP** or **128-Bit WEP** is selected, the wizard proceeds to the key entry dialog box unless the **Use Passkey** check box was selected in the **Encryption** dialog box (see *Figure 4-20 on page 4-13*). The **Key Entry** dialog box will be shown only if the authentication is set to **None**. To enter the key information:

1. Enter the 40-bit or 128-bit keys into the fields.
2. Tap **Next**.

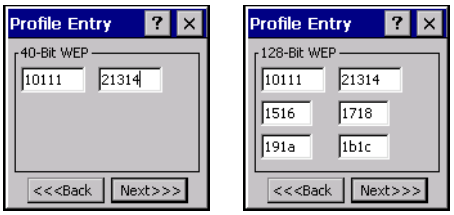

Figure 4-21 *40-Bit and 128-Bit WEP Keys Dialog Boxes*

Passkey Dialog

When selecting **None** as an authentication and **WEP** as an encryption, choose to enter a passkey by checking the **Use PassKey** check box. The user is prompted to enter the passkey. For WEP, the **Use PassKey** checkbox is only available if the authentication is **None**.

When selecting **None** as an authentication and **TKIP** as an encryption, the user must enter a passkey. The user cannot enter a passkey if the encryption is **TKIP** and the authentication is anything other than **None**.

When selecting **None** as an authentication and **AES** as an encryption, the user must enter a passkey. The user cannot enter a passkey if the encryption is **AES** and the authentication is anything other than **None**.

Figure 4-22 *Passkey Dialog Box*

Tap **Next**. The **IP Address Entry** dialog box displays.

IP Address Entry

Use the **IP Address Entry** dialog box to configure network address parameters: IP address, subnet mask, gateway, DNS, and WINS.

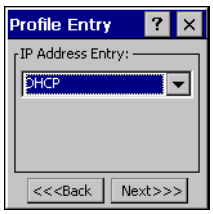

Figure 4-23 *IP Address Entry Dialog Box*

Table 4-10 *IP Address Entry*

Encryption	Description
DHCP	Select Dynamic Host Configuration Protocol (**DHCP**) from the **IP Address Entry** drop-down list to obtain a leased IP address and network configuration information from a remote server. DHCP is the default setting for the mobile computer profile.
Static	Select **Static** to manually assign the IP, subnet mask, default gateway, DNS, and WINS addresses the mobile computer profile uses.

Select either **DHCP** or **Static** from the drop-down list and tap **Next**. Selecting **Static IP** displays the **IP Address Entry** dialog box. Selecting **DHCP** displays the **Transmit Power** dialog box.

Use the **IP Address Entry** dialog box to enter the IP address and subnet information.

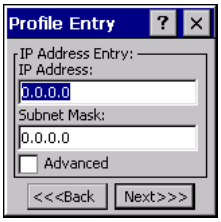

Figure 4-24 *Static IP Address Entry Dialog Box*

Table 4-11 *Static IP Address Entry Fields*

Field	Description
IP Address	The Internet is a collection of networks with users that communicate with each other. Each communication carries the address of the source and destination networks and the particular machine within the network associated with the user or host computer at each end. This address is called the IP address (Internet Protocol address). Each node on the IP network must be assigned a unique IP address that is made up of a network identifier and a host identifier. Enter the IP address as a dotted-decimal notation with the decimal value of each octet separated by a period, for example, 192.168.7.27.
Subnet Mask	Most TCP/IP networks use subnets to manage routed IP addresses. All IP addresses have a network part and a host part. The network part specifies a physical network. The host part specifies a host on that physical network. The subnet mask allows a network administrator to use some of the bits that are normally used to specify the host to instead specify physical sub-networks within an organization. This helps organize and simplify routing between physical networks.

Select the **Advanced** check box, then tap **NEXT** to display the **Advanced Address Entry** dialog box. Enter the Gateway, DNS, and WINS addresses. Tap **NEXT** without selecting the **Advanced** check box to display the **Transmit Power** dialog box.

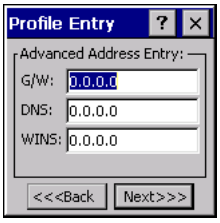

Figure 4-25 *Advanced Address Entry Dialog Box*

The IP information entered in the profile is only used if the **Enable IP Mgmt** check box in the **Options** > **System Options** dialog box was selected (*System Options on page 7-3*). If not selected, the IP information in the profile is ignored and the IP information entered in the Microsoft interface applies.

Table 4-12 *IP Config Advanced Address Entry Fields*

Field	Description
G/W	The default gateway forwards IP packets to and from a remote destination.
DNS	The Domain Name System (DNS) is a distributed Internet directory service. DNS translates domain names and IP addresses, and controls Internet email delivery. Most Internet services require DNS to operate properly. If DNS is not configured, Web sites cannot be located and/or email delivery fails.
WINS	WINS is a Microsoft® Net BIOS name server. WINS eliminates the broadcasts needed to resolve computer names to IP addresses by providing a cache or database of translations.

Tap **Next**. The **Transmit Power** dialog box displays.

Transmit Power

The **Transmit Power** drop-down list contains different options for Ad-Hoc and Infrastructure mode. Automatic (i.e., use the current AP settings) and Power Plus (use higher than the current AP settings) are available for **Infrastructure** mode.

Adjusting the radio transmission power level enables the user to expand or confine the transmission coverage area. Reducing the radio transmission power level reduces potential interference to other wireless devices that might be operating nearby. Increasing the radio transmission power level increases the range at which other wireless devices can “hear” the radio's signal.

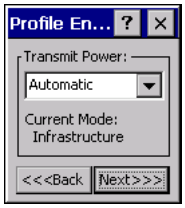

Figure 4-26 *Transmit Power Dialog Box (Infrastructure Mode)*

Table 4-13 *Transmit Power Dialog Box (Infrastructure Mode)*

Field	Description
Automatic	Select **Automatic** (the default) to use the AP power level.
Power Plus	Select **Power Plus** to set the mobile computer transmission power one level higher than the level set for the AP.

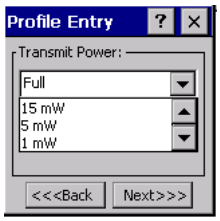

Figure 4-27 *Transmit Power Dialog Box (Ad-Hoc Mode)*

Table 4-14 *Power Transmit Options (Ad-Hoc Mode)*

Field	Description
Full	Select **Full** power for the highest transmission power level. Select **Full** power when operating in highly reflective environments and areas where other devices could be operating nearby, or when attempting to communicate with devices at the outer edge of a coverage area.
30 mW	Select **30 mW** to set the transmit power level to 30 mW.
15 mW	Select **15 mW** to set the transmit power level to 15 mW.
5 mW	Select **5 mW** to set the transmit power level to 5 mW.
1 mW	Select **1 mW** for the lowest transmission power level. Use this level when communicating with other devices in very close proximity, or in instances where little or no radio interference from other devices is expected.

Tap **Next** to display the **Battery Usage** dialog box.

Battery Usage

Use the **Battery Usage** dialog box to select power consumption of the wireless LAN. There are three settings available: CAM, Fast Power Save, and MAX Power Save. Battery usage cannot be configured in Ad-Hoc profiles.

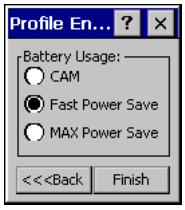

Figure 4-28 *Battery Usage Dialog Box*

NOTE Power consumption is also related to the transmit power settings.

Table 4-15 *Battery Usage Options*

Field	Description
CAM	Continuous Aware Mode (**CAM**) provides the best network performance, but yields the shortest battery life.
Fast Power Save	**Fast Power Save** (the default) performs in the middle of CAM and MAX Power Save with respect to network performance and battery life.
MAX Power Save	**Max Power Save** yields the longest battery life while potentially reducing network performance. In networks with minimal latency, Max Power Save performs as well as Fast Power Save, but with increased battery conservation.

Chapter 5 Manage Certificates Application

Introduction

Users can view and manage security certificates in the various certificate stores. Tap the **Signal Strength** icon > **Manage Certs**. The **Certificate Manager** window displays.

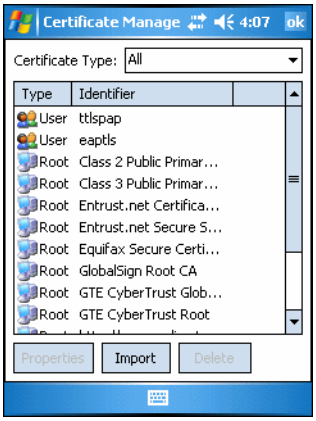

Figure 5-1 *Certificate Manager Window*

Various certificate types display at one time. Select the **Certificate Type** drop-down box to filter the certificate list to display **All**, only **Root/Server**, or only **User/Client** certificates.

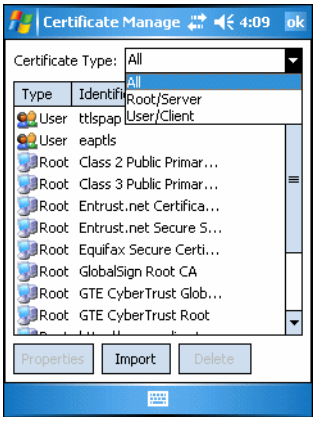

Figure 5-2 *Certificate Type Options*

The **Certificate Manager** window contains command buttons at the bottom of the window. A button might be disabled (gray) if the operation cannot be performed based on any selected object.

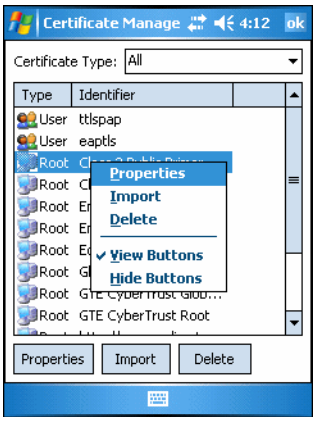

Figure 5-3 *Command Buttons and Context Menu*

These buttons can be hidden to allow more space for displaying the list of certificates. To hide the buttons tap-and-hold and/or double-tap the stylus in the list area depending on the mobile computer. It can also be brought up by pressing ALT-M on the keyboard. The pop-up menu appears.

Select **Hide Buttons** to hide the command buttons.

To display the buttons select **View Buttons** from the pop-up menu.

The pop-up menu also allows the user to select the **Properties**, **Import**, and **Delete** commands.

Certificate Properties

To display the detailed properties of a certificate, select a certificate in the list and tap the **Properties** button. The window display the properties of the certificate. Select a property in the upper list and the detailed information displays in the **Expanded Value** section.

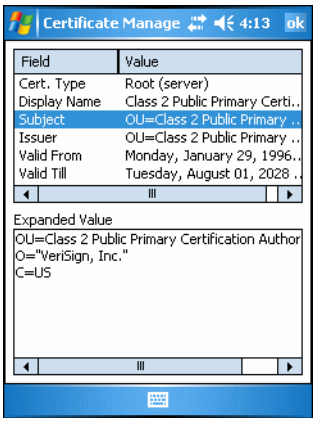

Figure 5-4 *Certificate Properties Window*

Tap **ok**, **Escape**, or **X** button to exit (depending on the mobile computer).

Import a Certificate

Import certificates from either files or from a server machine:

- .CER file - DER encrypted Root/Server certificates.
- .PFX file - Personal inFormation eXchange formatted file containing one or more Root/Server and/or User/Client Certificates. These files are usually protected by a password, so a password will be prompted for. If there is no password, enter nothing and select the **OK** button.
- Server - User/Client certificates can be requested directly from a Certificate Authority (CA) on the network. A User name, Password (optional), and the Server (an IP address) must be provided to obtain a certificate for the User from the CA.

Tap the **Import** button or select from the context menu. The **Import Certificate** dialog box displays.

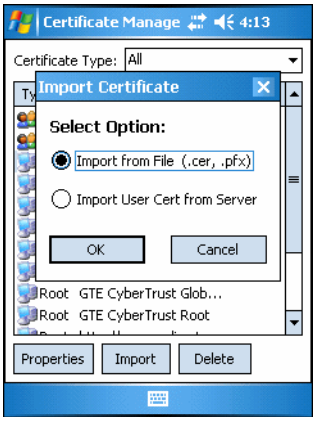

Figure 5-5 *Import Certificate Dialog Box*

Select the **Import from File (.cer, .pfx)** radio button to import a certificate file. The **Open** window displays.

Select the file to import.

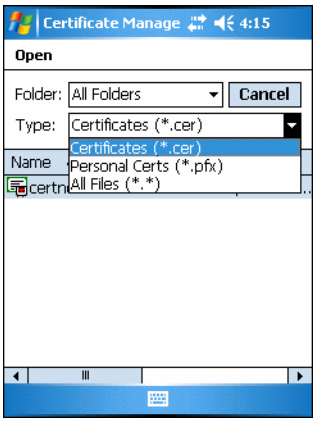

Figure 5-6 *Certificate Manage Window*

Select the **Import User Cert from Server** radio button to import a certificate from a server. The **Install From Server** window displays.

Enter the user, password, and server information in the respective text boxes.

Tap the **Retrieve** button to import the certificate.

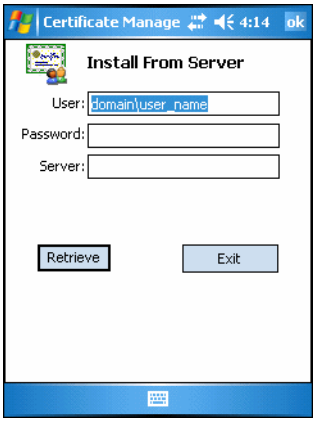

Figure 5-7 *Install From Server*

Delete a Certificate

To delete a certificates:

Select the certificate to delete.

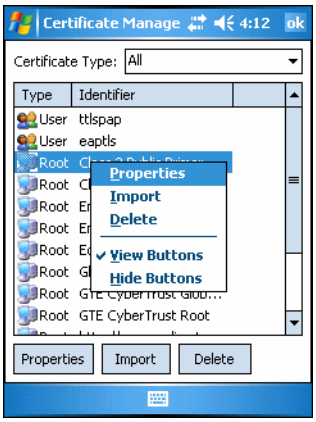

Figure 5-8 *Import Certificate Dialog Box*

Tap the **Delete** button or select **Delete** from the pop-up menu.

Chapter 6 Manage PACs Application

Introduction

Users can view and manage Protected Access Credentials (PACs) used by Cisco's EAP-FAST authentication protocol. Tap the **Signal Strength** icon > **Manage PACs**. The **PAC Manager** window displays.

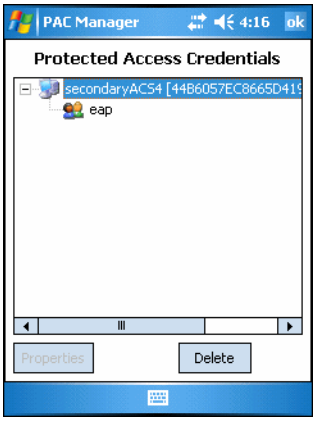

Figure 6-1 *PAC Manager Window*

PACs are uniquely identified by referencing a PAC Authority Identifier (A-ID) (the server that issued the PAC) and by the individual user identifier (I-ID). The PACs display sorted by A-ID (default) or by I-ID in a tree display.

The **PAC Manager** window contains buttons at the bottom of the window. A button might be disabled (gray) if the operation cannot be performed based on any selected object.

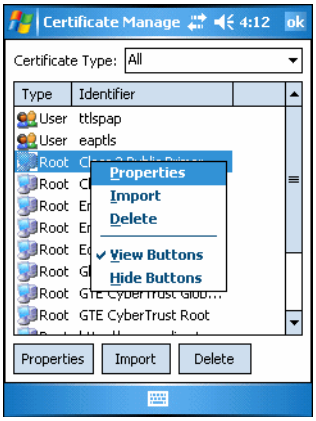

Figure 6-2 *Buttons and Pop-up Menu*

These buttons can be hidden to allow more space for displaying the list of certificates. To hide the buttons tap-and-hold and/or double-tap the stylus in the list area depending on the mobile computer. It can also be brought up by pressing ALT-M on the keyboard. The pop-up menu appears.

Select **Hide Buttons** to hide the buttons.

To display the buttons select **View Buttons** from the pop-up menu.

The pop-up menu also allows the user to select the **Properties** and **Delete** commands.

You can always sort by A-ID, sort by I-ID, view buttons and hide buttons in the pop-up menu.

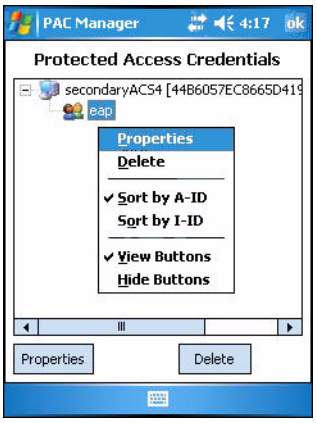

Figure 6-3 *Command Buttons and Context Menu*

PAC Properties

Display the detailed properties of a PAC by selecting an item in a sub-tree, and selecting the **Properties** button or pop-up menu. The following Window appears with the list of properties in the upper portion of the window. By selecting an entry in the upper list, the expanded details of the entry property displays in the lower list of the window.

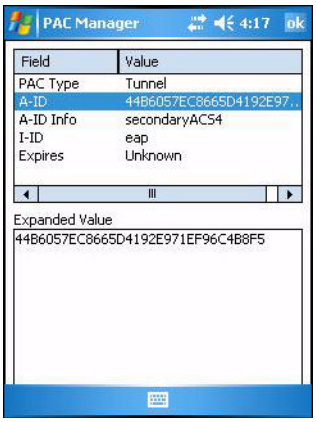

Figure 6-4 *PAC Properties Popup*

To return to the main page, tap the **Ok** button, **Escape**, or **X** button depending on the mobile computer.

Delete PAC

To delete a single PAC, tap a leaf item (right most tree item) to select the PAC, then select the **Delete** button or pop-up menu. A confirmation dialog box appears.

To delete a group of PACs having the same A-ID or same I-ID, sort the PACs by desired ID type, then tap on the parent item (left most tree item) to select the group. Select the **Delete** button or pop-up menu and a confirmation dialog box appears.

Chapter 7 Options

Introduction

Use the wireless **Option** dialog box to select one of the following operation options from the drop-down list:

- Operating Mode Filtering
- Regulatory
- Band Selection
- System Options
- Auto PAC Settings
- Change Password
- Export.

Operating Mode Filtering

The **Operating Mode Filtering** options cause the Find WLANs application to filter the available networks found.

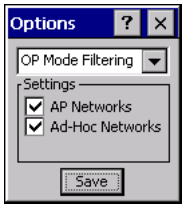

Figure 7-1 *OP Mode Filtering Dialog Box*

The **AP Networks** and **Ad-Hoc Networks** check boxes are selected by default.

Table 7-1 *OP Mode Filtering Options*

Field	Description
AP Networks	Select the **AP Networks** check box to display available AP networks and their signal strength within the **Available WLAN Networks** (see Chapter 2, Find WLAN Application). These are the APs in the vicinity available to the mobile computer for association. If this option was previously disabled, refresh the **Available WLAN Networks** window to display the AP networks available to the mobile computer.
AD-Hoc Networks	Select the **Ad-Hoc Networks** check box to display available peer (adapter) networks and their signal strength within the **Available WLAN Networks**. These are peer networks in the vicinity that are available to the mobile computer for association. If this option was previously disabled, refresh the **Available WLAN Networks** window to display the Ad Hoc networks available to the mobile computer.

Tap **Save** to save the settings or tap **X** to discard any changes.

Regulatory Options

Use the **Regulatory** settings to configure the country the mobile computer is in. Due to regulatory requirements (within a country) a mobile computer is only allowed to use certain channels.

Figure 7-2 *Regulatory Options Dialog Box*

Table 7-2 *Regulatory Options*

Field	Description
Settings	Select the country from the drop-down list. To connect to a profile, the profile country must match this setting, or the AP country setting if the *Enable 802.11d* check box is selected.
Enable 802.11d	The WLAN adapter attempts to retrieve the country from APs. Profiles which use *Infrastructure* mode can only connect if the country set is the same as the AP country settings or if the profile country setting is *Allow Any Country.* All APs must be configured to transmit the country information.

Band Selection

The **Band Selection** settings identify the frequency bands to scan when finding WLANs. These values refer to the 802.11 standard networks.

NOTE Select one band for faster access when scanning for WLANs.

Not all mobile devices support both 2.4 GHz and 5 GHz bands.

Figure 7-3 *Band Selection Dialog Box*

Table 7-3 *Band Selection Options*

Field	Description
2.4GHz Band	The **Find WLANs** application list includes all networks found in the 2.4 GHz band (802.11b and 802.11g).
5GHz Band	The **Find WLANs** application list includes all networks found in the 5 GHz band (802.11a).

Tap **Save** to save the settings or tap **X** to discard any changes.

System Options

Use **System Options** to set miscellaneous system setting.

Figure 7-4 *System Options Dialog Box*

Table 7-4 *System Options*

Field	Description
Profile Roaming	Configures the mobile computer to roam to the next available WLAN profile when it moves out of range of the current WLAN profile.

Table 7-4 *System Options (Continued)*

Field	Description
Enable IP Mgmt	Enables the Wireless Companion Services to handle IP address management. The Wireless Companion Service configures the IP based on what is configured in the network profile. Deselect this to manually configure the IP in the standard Windows IP window. Enabled by default.
Auto Time Config	Enables automatic update of the system time. Network association updates the device time based on the time set in the AP. This proprietary feature is only supported with Symbol infrastructure. Enabled by default.

Auto PAC Settings

Use the Auto PAC Settings to configure whether to allow automatic PAC provisioning and automatic PAC refreshing when using the EAP-FAST authentication protocol.

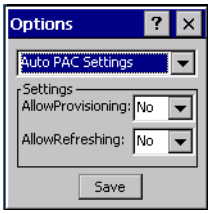

Figure 7-5 *Auto PAC Settings Dialog Box*

Table 7-5 *Auto PAC Settings*

Field	Description
AllowProvisioning	Select Yes from the drop down list to allow the terminal to be automatically provisioned with a PAC when using the EAP-FAST authentication protocol. Select No to disallow automatic PAC provisioning.
Allow Refreshing	Select Yes from the drop down list to allow an existing PAC on the terminal to be automatically refreshed when using the EAP-FAST authentication protocol. Select No to disallow automatic PAC refreshing.

If the master key has expired then the PAC on the device that was generated with this expired key will have to be manually deleted and a new PAC provisioned even when “Allow Refreshing” is turned ON.

Change Password

Use **Change Password** to require a password before editing a profile. This allows pre-configuring profiles and prevents users from changing the network settings. The user can use this feature to protect settings from a guest user. By default, the password is not set.

Figure 7-6 *Change Password Window*

To create a password for the first time, leave the **Current:** text box empty and enter the new password in the **New:** and **Confirm:** text boxes. Tap **Save**.

To change an existing password, enter the current password in the **Current:** text box and enter the new password in the **New:** and **Confirm:** text boxes. Tap **Save**.

To delete the password, enter the current password in the **Current:** text box and leave the **New:** and **Confirm:** text boxes empty. Tap **Save.**

NOTE Passwords are case sensitive and can not exceed 63 characters.

Export

NOTE For Windows CE 5.0 devices, exporting options enables settings to persists after cold boot. For Mobile 5.0 devices, exporting options enables settings to persists after clean boot. See *Persistence on page 11-1* for more information.

Use **Export** to export all profiles to a registry file, and to export the options to a registry file.

Figure 7-7 *Options - Export Dialog Box*

To export options:

1. Tap **Export Options**. The **Save As** dialog box displays.

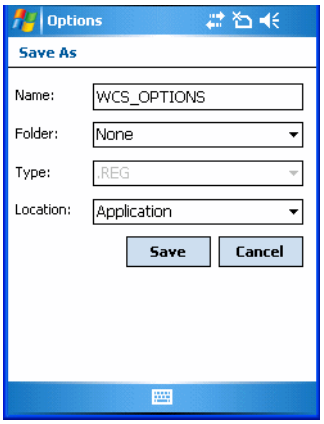

Figure 7-8 *Export Options Save As Dialog Box*

2. Enter a filename in the **Name:** field. The default filename is WCS_OPTIONS.REG.
3. Select the desired folder.
4. Tap **Save**.

To export all profiles:

1. Tap **Export All Profiles**. The **Save As** dialog box displays.

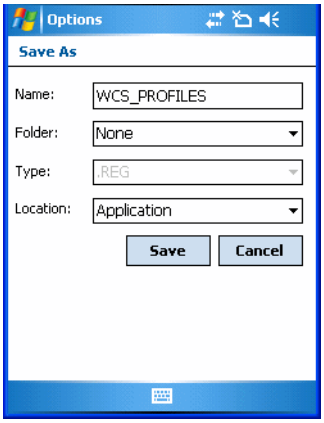

Figure 7-9 *Export All Profiles Save As Dialog Box*

2. Enter a filename in the **Name:** field. The default filename is WCS_PROFILES.REG.
3. In the **Folder:** drop-down list, select the desired folder.
4. Tap **Save**.

Selecting **Export All Profiles** also saves an indication of the current profile. This information is used to determine which profile to connect with after a warm boot or cold boot.

Chapter 8 Wireless Status Application

Introduction

To open the **Wireless Status** window, tap the **Signal Strength** icon > **Wireless Status**. The **Wireless Status** window displays information about the wireless connection.

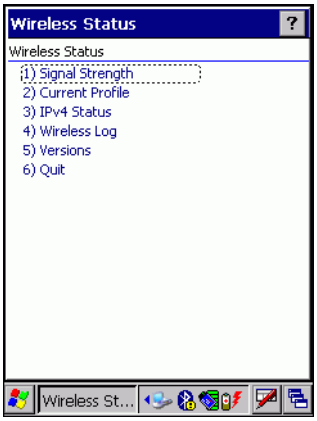

Figure 8-1 *Wireless Status Window*

The **Wireless Status** window contains the following options. Tap the option to display the option window.

- Signal Strength - provides information about the connection status of the current wireless profile.
- Current Profile - displays basic information about the current profile and connection settings.
- IPv4 Status - displays the current IP address, subnet, and other IP related information assigned to the mobile computer.
- Wireless Log - displays a log of important recent activity, such as authentication, association, and DHCP renewal completion, in time order.
- Versions - displays software, firmware, and hardware version numbers.
- Quit - exits the **Wireless Status** window.

Option windows contain a back button to return to the main **Wireless Status** window.

Signal Strength Window

The **Signal Strength** window provides information about the connection status of the current wireless profile including signal quality, missed beacons, and transmit retry statistics. The BSSID address (shown as *AP MAC Address*) displays the AP currently associated with the connection. In Ad-Hoc mode, the AP MAC Address shows the BSSID of the Ad-Hoc network. Information in this window updates every 2 seconds.

To open the **Signal Status** window, tap **Signal Strength** in the **Wireless Status** window.

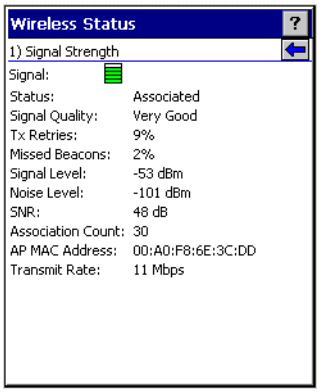

Figure 8-2 *Signal Strength Window*

After viewing the **Signal Strength** window, tap the back button to return to the **Wireless Status** window.

Table 8-1 *Signal Strength Status*

Field	Description
Signal	Displays the Relative Signal Strength Indicator (RSSI) of the signal transmitted between the AP and mobile computer. As long as the Signal Quality icon is green the AP association is not jeopardized. If the icon is red (poor signal), an association with a different AP could be warranted to improve the signal. The signal strength icon changes depending on the signal strength.
	Excellent Signal
	Very Good Signal
	Good Signal
	Fair Signal
	Poor Signal
	Out of Range (no signal)
	The radio card is off or there is a problem communicating with the radio card.
Status	Indicates if the mobile computer is associated with the AP.
Signal Quality	Displays a text format of the Signal icon.
Tx Retries	Displays a percentage of the number of data packets the mobile computer retransmits. The fewer transmit retries, the more efficient the wireless network is.

Table 8-1 *Signal Strength Status (Continued)*

Field	Description
Missed Beacons	Displays a percentage of the amount of beacons the mobile computer missed. The fewer missed beacons, the more efficient the wireless network is. Beacons are uniform system packets broadcast by the AP to keep the network synchronized.
Signal Level	The AP signal level in decibels per milliwatt (dBm).
Noise Level	The background interference (noise) level in decibels per milliwatt (dBm).
SNR	The access point/mobile computer Signal to Noise Ratio (SNR) of signal strength to noise (interference) in decibels per milliwatt (dBm).
Association Count	Displays the number of times the mobile computer has roamed from one AP to another.
AP MAC Address	Displays the MAC address of the AP to which the mobile computer is connected.
Transmit Rate	Displays the current rate of the data transmission.

Current Profile Window

The **Current Profile** window displays basic information about the current profile and connection settings. This window updates every two seconds.

To open the **Current Profile** window, tap **Current Profile** in the **Wireless Status** window.

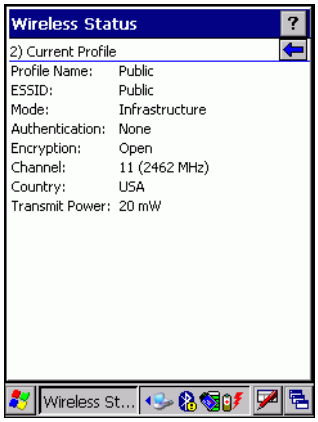

Figure 8-3 *Current Profile Window*

Table 8-2 *Current Profile Window*

Field	Description
Profile Name	Displays the name of the profile that the mobile computer is currently using to communicate with the AP.
ESSID	Displays the current profile's ESSID.
Mode	Displays the current profile's mode, either Infrastructure or Ad-Hoc.
Authentication	Displays the current profile's authentication type.

Table 8-2 *Current Profile Window*

Field	Description
Encryption	Displays the current profile's encryption type.
Channel	Displays the channel currently being used to communicate with the AP.
Country	Displays the country setting currently being used.
Transmit Power	Displays the current radio transmission power level.

IPv4 Status Window

The **IPv4 Status** window displays the current IP address, subnet, and other IP related information assigned to the mobile computer. It also allows renewing the address if the profile is using DHCP to obtain the IP information. Tap **Renew** to initiate the IP address renewal process. The **IPv4 Status** window updates automatically when the IP address changes.

To open the **IPv4 Status** window, tap **IPv4 Status** in the **Wireless Status** window.

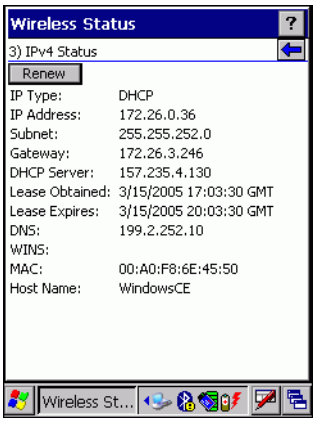

Figure 8-4 *IPv4 Status Window*

Table 8-3 *IPv4 Status Fields*

Field	Description
IP Type	Displays the IP address assignment method used for the current profile: **DHCP** or **Static**. If the IP Type is DHCP, the IP Address and other information shown is obtained from the DHCP server. In this case, the DHCP Server address and the Lease information will also be shown. If the IP Type is Static, the IP Address and other information shown are those that were input manually in the **IP Config** tab on page 4-19.
IP Address	Displays the mobile computer's IP address. The Internet is a collection of networks with users that communicate with each other. Each communication carries the address of the source and destination networks and the particular machine within the network associated with the user or host computer at each end. This address is called the IP address. Each node on the IP network must be assigned a unique IP address that is made up of a network identifier and a host identifier. The IP address is shown in dotted-decimal notation with the decimal value of each octet separated by a period, for example, 192.168.7.27.

Table 8-3 *IPv4 Status Fields (Continued)*

Field	Description
Subnet	Displays the mobile computer's subnet mask. Most TCP/IP networks use subnets to manage routed IP addresses. All IP addresses have a network part and a host part. The network part specifies a physical network. The host part specifies a host on that physical network. The subnet mask allows a network administrator to use some of the bits that are normally used to specify the host to instead specify physical sub-networks within an organization. This helps organize and simplify routing between physical networks.
Gateway	Displays the gateway address. A gateway forwards IP packets to and from a remote destination.
DCHP Server	Displays the IP address of the DHCP server.
Lease Obtained	Displays the date and time that the IP address was obtained.
Lease Expires	Displays the date and time that the IP address expires.
DNS	Displays the IP address of the DNS server.
WINS	WINS is a Microsoft Net BIOS name server. WINS eliminates the broadcasts needed to resolve computer names to IP addresses by providing a cache or database of translations.
MAC	The IEEE 48-bit address is assigned to the mobile computer at the factory to uniquely identify the adapter at the physical layer.
Host Name	Displays the name of the mobile computer.

Wireless Log Window

The **Wireless Log** window displays a log of recent activity, such as authentication, association, and DHCP renewal completion, in time order. Save the log to a file or clear the log. The auto-scroll feature automatically scrolls down when new items are added to the log.

To open the **Wireless Log** window, tap **Wireless Log** in the **Wireless Status** window. The **Wireless Log** window displays.

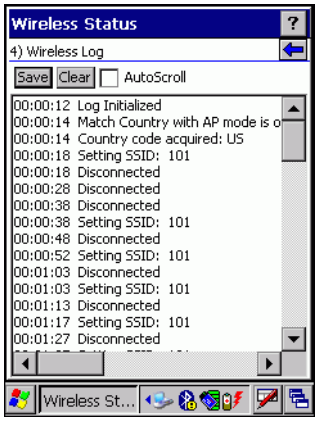

Figure 8-5 *Wireless Log Window*

Saving a Log

To save a Wireless Log:

1. Tap the **Save** button. The **Save As** dialog box displays.
2. Navigate to the desired folder.
3. In the **Name** field, enter a file name and then tap **OK**. The Wireless Log is saved as a text file in the selected folder.

Clearing the Log

To clear the log, tap **Clear**.

Versions Window

The **Versions** window displays software version numbers for the suite of Wireless Companion applications. The content of the window is determined at runtime, along with the actual software components to display in the list. The executable paths of the software components on the list are defined in registry, so that the application can retrieve version information from the executable. “File not found” appears if the executable cannot be found at the specified path.

To open the **Versions** window, tap **Versions** in the **Wireless Status** window.

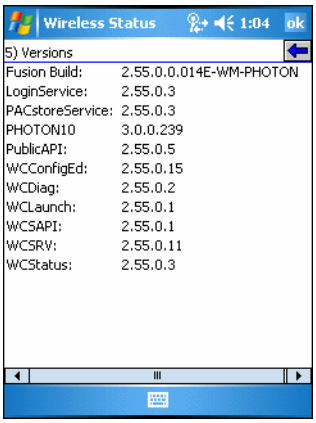

Figure 8-6 *Versions Window*

The window displays software version numbers for the following:

- Fusion Build
- LoginService
- PACStoreServer
- Photon10
- PublicAPI
- WCConfigEd
- WCDiag

- WCLaunch
- WCSAPI
- WCSRV
- WCStatus.

Chapter 9 Wireless Diagnostics Application

Introduction

The **Wireless Diagnostics** application window provides links to perform ICMP Ping, Trace Routing, and Known APs functions. To open the **Wireless Diagnostics** window, tap the **Signal Strength** icon > **Wireless Diagnostics**.

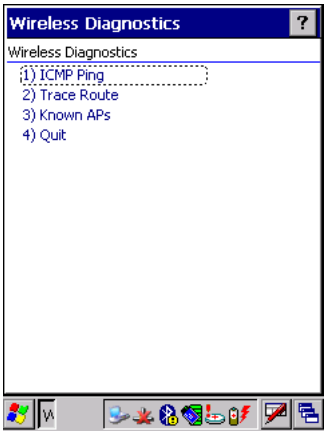

Figure 9-1 *Wireless Diagnostics Window*

The **Wireless Diagnostics** window contains the following options. Tap the option to display the option window.

- ICMP Ping - tests the wireless network connection.
- Trace Route - tests a connection at the network layer between the mobile computer and any place on the network.
- Known APs - displays the APs in range using the same ESSID as the mobile computer.
- Quit - Exits the **Wireless Diagnostics** window.

Option windows contain a back button to return to the **Wireless Diagnostics** window.

ICMP Ping Window

The **ICMP Ping** window allows testing a connection at the network layer (part of the IP protocol) between the mobile computer and any other device on the network. Ping tests only stop when the **Stop Test** button is selected, close the **Wireless Diagnostics** application, or if the mobile computer switches between infrastructure and ad-hoc modes.

To open the **ICMP Ping** window, tap **ICMP Ping** in the **Wireless Diagnostics** window.

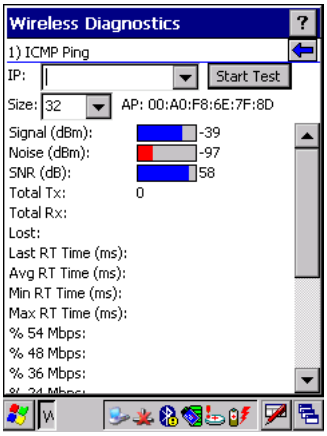

Figure 9-2 *ICMP Ping Window*

To perform an ICMP ping:

1. In the **IP** field, enter an IP address or select an IP address from the drop-down list.
2. From the **Size** drop-down list, select a size value.
3. Tap **Start Test**. The ICMP Ping test starts. Information of the ping test displays in the appropriate fields.

Trace Route Window

Trace Route traces a packet from a computer to a host, showing how many hops the packet requires to reach the host and how long each hop takes. The **Trace Route** utility identifies where the longest delays occur.

The **Trace Route** window allows testing a connection at the network layer (part of the IP protocol) between the mobile computer and any other device on the network.

To open the **Trace Route** window, tap **Trace Route** in the **Wireless Diagnostics** window.

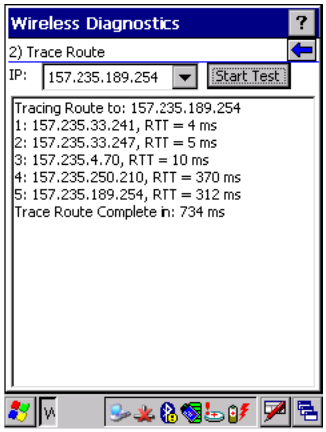
Wireless Diagnostics
2) Trace Route
IP:
157.235.189.254
Start Test
Tracing Route to: 157.235.189.254
1: 157.235.33.241, RTT = 4 ms
2: 157.235.33.247, RTT = 5 ms
3: 157.235.4.70, RTT = 10 ms
4: 157.235.250.210, RTT = 370 ms
5: 157.235.189.254, RTT = 312 ms
Trace Route Complete in: 734 ms

Figure 9-3 *Trace Route Window*

In the IP combo box, enter an IP address or choose one from the drop-down list, or enter a DNS Name and tap **Start Test**. When starting a test, the trace route attempts to find all routers between the mobile computer and the destination. The Round Trip Time (RTT) between the mobile computer and each router appears, along with the total test time. The total test time may be longer than all RTTs added together because it does not only include time on the network.

Known APs Window

The **Known APs** window displays the APs in range using the same ESSID as the mobile computer. This window is only available in **Infrastructure** mode. To open the **Known APs** window, tap **Known APs** in the **Wireless Diagnostics** window.

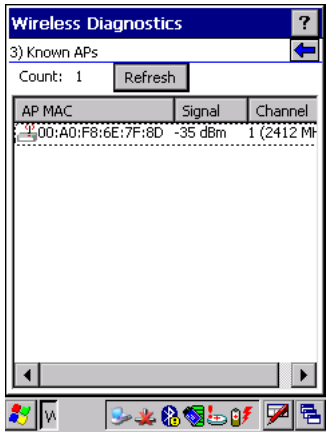

Figure 9-4 *Known APs Window*

See *Table 9-1* for the definitions of the icons next to the AP.

Table 9-1 *Current Profile Window*

Icon	Description
	The AP is the associated access point, and is set to mandatory.
	The AP is the associated access point, but is not set to mandatory.

Table 9-1 *Current Profile Window*

Icon	Description
	The mobile computer is not associated to this AP, but the AP is set as mandatory.
	The mobile computer is not associated to this AP, and the AP is not set as mandatory.

Tap and hold on an AP to display a pop-up menu with the following options: **Set Mandatory** and **Set Roaming**.

Select **Set Mandatory** to prohibit the mobile computer from associating with a different AP. The letter *M* displays on top of the icon. The mobile computer connects to the selected AP and never roams until:

- **Set Roaming** is selected.
- **Set Mandatory** is selected on a different AP.
- Manually connecting to a profile from the Manage Profiles page.
- The mobile computer roams to a new profile.
- The mobile computer resumes after being suspended.
- The mobile computer resets (warm or cold).

Select **Set Roaming** to allow the mobile computer to roam to any AP with a better signal. These settings are temporary and never saved to the registry.

Tap **Refresh** to update the list of the APs with the same ESSID.

Chapter 10 Log on/Off Application

Introduction

When the user launches the **Log On/Off** application, the mobile computer may be in one of two states; the user may be logged onto the mobile computer by already entering credentials through the login box, or there is no user logged on. Each of these states has a separate set of use cases and a different look to the dialog box.

User Already Logged In

If already logged into the mobile computer, the user can launch the login dialog box for the following reasons:

- Connect to a different profile.
- Connect to and re-enable a cancelled profile. To do this:
  - Launch the Log On/Off dialog.
  - Select the cancelled profile from the profile drop-down list.
  - Login to the profile.

NOTE A cancelled profile can be re-enabled by using the **Manage Profile** window to connect to the cancelled profile.

- Log off the mobile computer to prevent another user from accessing the current users network privileges.
- Switch mobile computer users to quickly logoff the mobile computer and allow another user to log into the mobile computer.

No User Logged In

If no user is logged into the mobile computer, launch the login dialog box and log in to access user profiles.

The **Login** dialog box varies if it is:

- Launched by WCS, because the service is connecting to a new profile that needs credentials.
- Launched by WCS, because the service is trying to verify the credentials due to credential caching rules.

- Launched by a user, when a user is logged in.
- Launched by a user, when no user is logged in.

Table 10-1 *Log On/Off Options*

Field	Description
Wireless Profile Field	When launching the login application, the Wireless Profile field has available all the wireless profiles that require credentials. This includes profiles that use EAP TLS, PEAP, LEAP, EAP-TTLS and EAP-FAST.
Profile Status Icon	The profile status icon (next to the profile name) shows one of the following states: The selected profile is cancelled. The selected profile is enabled but is not the current profile. The profile is the current profile (always the case for WCS Launched).
Username, Password, and Domain Name Fields	The Username, Password, and Domain Name fields are used as credentials for the profile selected in the Wireless Profile field. The Password fields is limited to 63 characters. The Username and Domain Name fields combined are limited to 63 characters.
Mask Password Checkbox	The *Mask Password* checkbox determines whether the password field is masked (i.e., displays only the '*' character) or unmasked (i.e., displays the entered text). Check the box to unmask the password. Uncheck the box to mask the password (the default).
Status Field	The status field indicates the reason the dialog is open.

Tapping **OK** sends the credentials to the WCS. If there are no credentials entered, a dialog box displays asking the user to fill in all required fields.

The **Log Off** button only displays when a user is already logged on. When the **Log Off** button is tapped, the user is prompted with three options: Log Off, Switch Users, and Cancel. Switching users logs off the current user and re-initialize the login dialog box to be displayed for when there is no user logged on. Logging off logs off the current user and close the login dialog box. Tapping **Cancel** closes the Log Off dialog box and returns to the Login dialog box.

When the user is logged off, the mobile computer only roams to profiles that do not require credentials or to profiles that were created with the credentials entered into the profile

The **Cancel** button closes the dialog without logging into the network. If the login dialog was launched by the WCS and not by the user, tapping **Cancel** first causes a message box to display a warning that the cancel disables the current profile. If the user still chooses to cancel the login at this point, the profile is cancelled.

Once a profile is cancelled, the profile is suppressed until a user actively re-enables it or a new user logs onto the mobile computer.

Chapter 11 Persistence and Registry Settings

Persistence

Export options and profiles to provide cold boot persistence for Windows CE 5.0 devices and clean boot persistence for Mobile 5.0 devices. Save the exported registry files in the **Application** folder to use them on a cold boot or clean boot to automatically restore previous profile and option settings.

To save server certificates for persistence, save the certificate files in the folder **Application\RootCerts** to install the certificates automatically on a cold or clean boot.

User certificates that are installed into the Microsoft Certificate Store by the user, either through the Profile Editor Wizard or through the Fusion Certificate Manager application, are automatically saved in a special format to files in the Application\UserCerts folder. On a cold or clean boot, the user certificates will be automatically restored.

Registry Settings

Use the keys in the registry to modify some of the behaviors of the wireless applications. The registry path is:

HKLM\SOFTWARE\Symbol Technologies, Inc.\Configuration Editor

Table 11-1 *Registry Parameter Settings*

Key	Type	Default	Description
CertificateDirectory	REG_SZ	\Applications	The default directory to find certificates.
EncryptionMask	REG_DWORD	0x0000001F	Defines the supported encryption types. This is a bitwise mask with each bit corresponding to an encryption type. 1 = Type is supported 0 = Type is not supported Bit Number — Encryption Type 0 — None 1 — 40-Bit WEP 2 — 128-Bit WEP 3 — TKIP 4 — AES

Glossary

A

API. An interface by means of which one software component communicates with or controls another. Usually used to refer to services provided by one software component to another, usually via software interrupts or function calls

C

Cold Boot. A cold boot restarts the mobile computer and erases all user stored records and entries.

Cradle. A cradle is used for charging the terminal battery and for communicating with a host computer, and provides a storage place for the terminal when not in use.

D

Device Configuration Package. The Symbol Device Configuration Package provides the Product Reference Guide (PRG), flash partitions, Terminal Configuration Manager (TCM) and the associated TCM scripts. With this package hex images that represent flash partitions can be created and downloaded to the mobile computer.

H

Hard Reset. See **Cold Boot**.

Host Computer. A computer that serves other terminals in a network, providing such services as computation, database access, supervisory programs and network control.

I

IEEE Address. See **MAC Address**.

I/O Ports. interface The connection between two devices, defined by common physical characteristics, signal characteristics, and signal meanings. Types of interfaces include RS-232 and PCMCIA.

Input/Output Ports. I/O ports are primarily dedicated to passing information into or out of the terminal's memory. Series 9000 mobile computers include Serial and USB ports.

IP. Internet Protocol. The IP part of the TCP/IP communications protocol. IP implements the network layer (layer 3) of the protocol, which contains a network address and is used to route a message to a different network or subnetwork. IP accepts "packets" from the layer 4 transport protocol (TCP or UDP), adds its own header to it and delivers a "datagram" to the layer 2 data link protocol. It may also break the packet into fragments to support the maximum transmission unit (MTU) of the network.

IP Address. (Internet Protocol address) The address of a computer attached to an IP network. Every client and server station must have a unique IP address. A 32-bit address used by a computer on a IP network. Client workstations have either a permanent address or one that is dynamically assigned to them each session. IP addresses are written as four sets of numbers separated by periods; for example, 204.171.64.2.

IPX/SPX. Internet Package Exchange/Sequential Packet Exchange. A communications protocol for Novell. IPX is Novell's Layer 3 protocol, similar to XNS and IP, and used in NetWare networks. SPX is Novell's version of the Xerox SPP protocol.

K

Key. A key is the specific code used by the algorithm to encrypt or decrypt the data. Also see, **Encryption** and **Decrypting**.

M

MC. Mobile Computer.

MDN. Mobile Directory Number. The directory listing telephone number that is dialed (generally using POTS) to reach a mobile unit. The MDN is usually associated with a MIN in a cellular telephone -- in the US and Canada, the MDN and MIN are the same value for voice cellular users. International roaming considerations often result in the MDN being different from the MIN.

MIN. Mobile Identification Number. The unique account number associated with a cellular device. It is broadcast by the cellular device when accessing the cellular system.

Mobile Computer. In this text, *mobile computer* refers to the Symbol Series 9000 wireless portable computer. It can be set up to run as a stand-alone device, or it can be set up to communicate with a network, using wireless radio technology.

O

Open Data-Link Interface (ODI). Novell's driver specification for an interface between network hardware and higher-level protocols. It supports multiple protocols on a single NIC (Network Interface Controller). It is capable of understanding and translating any network information or request sent by any other ODI-compatible protocol into something a NetWare client can understand and process.

Open System Authentication. Open System authentication is a null authentication algorithm.

P

PAN . Personal area network. Using Bluetooth wireless technology, PANs enable devices to communicate wirelessly. Generally, a wireless PAN consists of a dynamic group of less than 255 devices that communicate within about a 33-foot range. Only devices within this limited area typically participate in the network.

Parameter. A variable that can have different values assigned to it.

PING. (Packet Internet Groper) An Internet utility used to determine whether a particular IP address is online. It is used to test and debug a network by sending out a packet and waiting for a response.

Q

QWERTY. A standard keyboard commonly used on North American and some European PC keyboards. "QWERTY" refers to the arrangement of keys on the left side of the third row of keys.

R

RAM. Random Access Memory. Data in RAM can be accessed in random order, and quickly written and read.

RF. Radio Frequency.

Router. A device that connects networks and supports the required protocols for packet filtering. Routers are typically used to extend the range of cabling and to organize the topology of a network into subnets. See **Subnet**.

S

Shared Key. Shared Key authentication is an algorithm where both the AP and the MU share an authentication key.

SID. System Identification code. An identifier issued by the FCC for each market. It is also broadcast by the cellular carriers to allow cellular devices to distinguish between the home and roaming service.

SMDK. Symbol Mobility Developer's Kit.

Soft Reset. See **Warm Boot**.

Subnet. A subset of nodes on a network that are serviced by the same router. See **Router**.

Subnet Mask. A 32-bit number used to separate the network and host sections of an IP address. A custom subnet mask subdivides an IP network into smaller subsections. The mask is a binary pattern that is matched up with the IP address to turn part of the host ID address field into a field for subnets. Default is often 255.255.255.0.

T

TCP/IP. (Transmission Control Protocol/Internet Protocol) A communications protocol used to internetwork dissimilar systems. This standard is the protocol of the Internet and has become the global standard for communications. TCP provides transport functions, which ensures that the total amount of bytes sent is received correctly at the other end. UDP is an alternate transport that does not guarantee delivery. It is widely used for real-time voice and video transmissions where erroneous packets are not retransmitted. IP provides the routing mechanism. TCP/IP is a routable protocol, which means that all messages contain not only the address of the destination station, but the address of a destination network. This allows TCP/IP messages to be sent to multiple networks within an organization or around the world, hence its use in the worldwide Internet. Every client and server in a TCP/IP network requires an IP address, which is either permanently assigned or dynamically assigned at startup.

Terminal. See **Mobile Computer**.

TFTP. (Trivial File Transfer Protocol) A version of the TCP/IP FTP (File Transfer Protocol) protocol that has no directory or password capability. It is the protocol used for upgrading firmware, downloading software and remote booting of diskless devices.

U

UDP. User Datagram Protocol. A protocol within the IP protocol suite that is used in place of TCP when a reliable delivery is not required. For example, UDP is used for real-time audio and video traffic where lost packets are simply ignored, because there is no time to retransmit. If UDP is used and a reliable delivery is required, packet sequence checking and error notification must be written into the applications.

W

Warm Boot. A warm boot restarts the mobile computer by closing all running programs. All data that is not saved to flash memory is lost.

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Motorola, Inc.
One Motorola Plaza
Holtsville, New York 11742, USA
1-800-927-9626
http://www.symbol.com

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